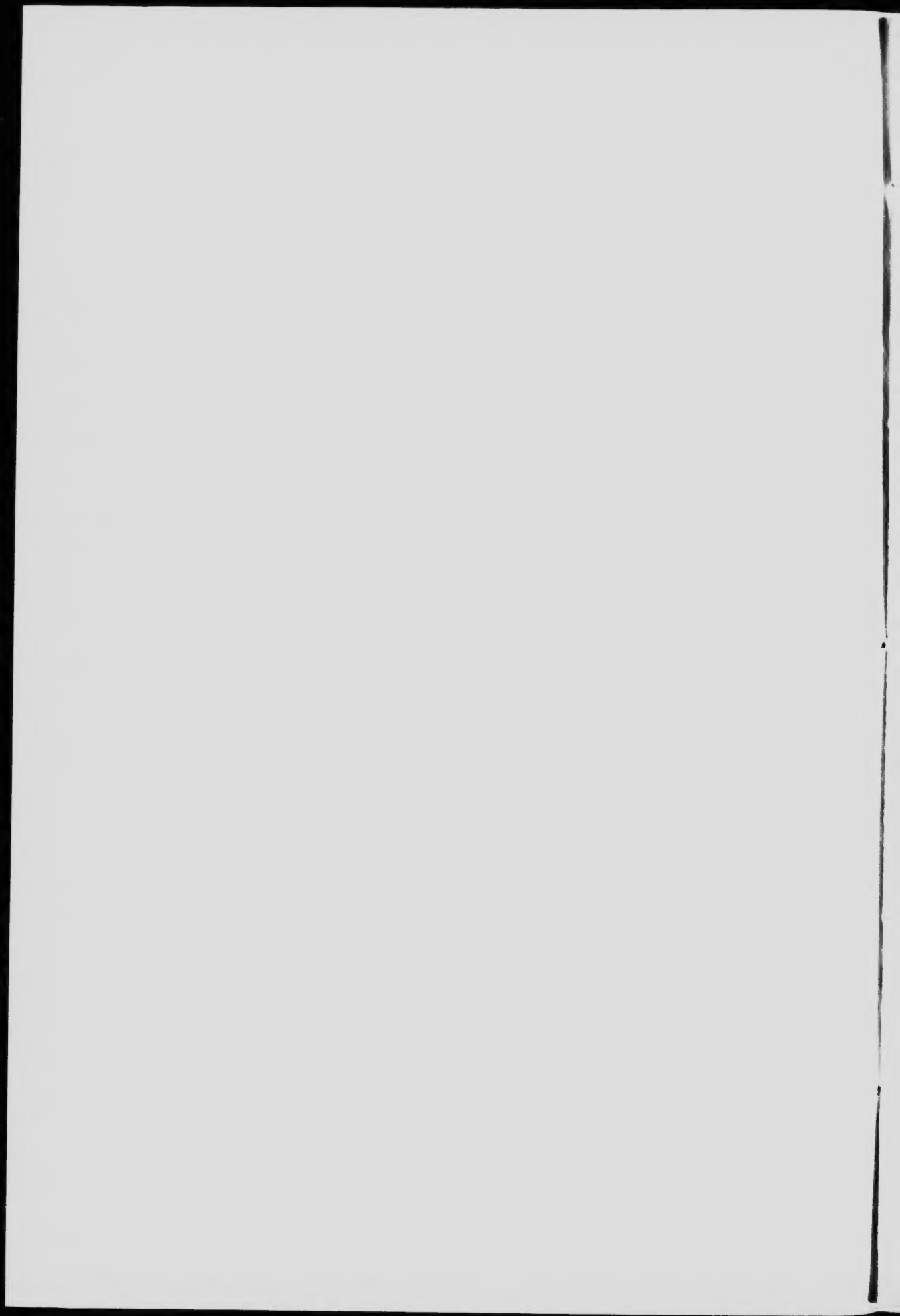




ENGINEERS' REPORTS

BY

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INTRODUCTION TO REPORT

BY

J. AUSTEN BANCROFT

PROFESSOR OF GEOLOGY AT MCGILL UNIVERSITY

MONTREAL, CANADA.

In 1912 Prof. J. Austen Bancroft was commissioned by the Provincial Government to report upon the Harricana District, and his examination resulted in a report which may be found in detail in his "Report on the Geology and Natural Resources of an Area embracing the Headwaters of the Harricana River, Northwestern Quebec; 1912, pages 217-229." -- As regards the origin of the gold-bearing ore bodies in this vicinity, his report states as follows:

As to origin, these veins are closely related to pegmatite dykes. In a sense they are intermediate between pegmatite dykes and true fissure veins. They were formed during the final stages of the cooling down of the granite that invaded this region in the form of batholiths, irregular bosses and dykes. That they originally were formed at great depth is evidenced by the geology of the region, which makes clear that they have been exposed by most profound erosion. They represent the result of prolonged exhalations of vapours and highly heated solutions attending the crystallization of the interior portions of the bodies of granite. The granodiorite (a phase of the granite) on Sullivan's property, which is traversed by a remarkable display of small quartz-tourmaline veins, some of which carry gold, contains very much less quartz than exposures of otherwise similar rocks toward the southern end of Blouin lake and in places in the vicinity of the first group of rapids on the river leading from this lake to Atikamek lake. No quartz veins of any importance were observed in those localities where quartz is an abundant constituent within the granodiorite. This suggests that during the solidification of the granodiorite on Sullivan's claim, the crystallization of the quartz was deferred somewhat, thus increasing the acidity of the still uncooled interior portions of the plutonic body of magma. In this sense the quartz veins may represent the siliceous extreme of the cooling magma, which at that time emanated from depth in the form of highly heated solutions and vapours carrying quartz, tourmaline, etc.

Montreal, May 20th, 1919.

Mr. Saul E. Melkman,
605 McGill Building,
Montreal.

Dear Sir:—

The following report is the result of two days (May 7th - 9th) spent by the writer on the mineral claims of the Sisoe Mining Syndicate to the south of Amos in North-western Quebec.

1919
(60)

LOCATION AND COMMUNICATION

In a straight line, these mineral claims are situated 32 miles S.S.E. of the rapidly growing little town of Amos where the National Transcontinental Railway crosses the Harricana River which flows northward into James Bay. Amos lies within the fertile "Clay Belt" of Northwestern Quebec and the surrounding country is rapidly being taken up by settlers engaged in farming and lumbering. Amos is now the community centre for about 2000 inhabitants.

By railway (C.N.R. to Hervey Jct., and then westward on the N.T.R.), Amos is 470 miles from Montreal; by railway, it is also 133 miles west of Quebec and 141 miles east of Cochrane, Ont.

Southward from Amos, the Harricana River and its lakes are navigable for motor-boats and small river steamers for a distance of 60 miles. Within this distance (see accompanying printed map), the river locally expands into five lakes of which the two largest are Seal's Home Lake (known also as Lake Askikwaj or as Lake La Motte) and Lake Kienawisik (known also as Lake de Montigny). That stretch of river between Seal's Home Lake and Lake Kienawisik is locally called the Askikwaj River.

The mineral claims of the Siscoe Mining Syndicate comprise about 360 acres and occupy by far the major part of the largest island in Lake Kienawisik. By the Harricana River and its lakes, these claims are 40 miles from Amos.

During periods of low water, navigation for boats that draw more than two to three feet of water becomes difficult opposite the mouth of Peter Brown Creek which enters the Harricana River from the east about four miles south of Amos, and also for two or three hundred yards in the vicinity of the discharge of Lake Kienawisik. Hence in attempting to develop any mining claims on Lake Kienawisik, it would be advisable to transport heavy equipment and supplies during the high water of the spring and early summer.

In the latter part of November, the lakes become frozen over and the ice usually breaks up during the first week in May; stretches of the river between the lakes remain more or less open during the winter. During winter months, communication with Lake Kienawisik is maintained by road from Amos to Seal's Home Lake which Lake is crossed on the ice and thence by a winter road, 10 miles in length, between Seal's Home Lake and Lake Kienawisik. From Amos to the Siscoe Mineral Claims by this winter route, the distance is about 39 miles.

History of Discovery of Gold on Lake Kienawisik. (De Montigny)

On the eleventh of July, 1911, Messrs. J. J. Sullivan and Hertel Authier discovered gold in a quartz vein on the eastern shore of Kienawisik Lake. The discovery did not become known to the public until late in the autumn of the same year, when numerous prospectors were attracted to the neighborhood of this Lake. By the autumn of 1912, native gold had been discovered on three claims in the area. During the summer of 1912, the writer made a reconnaissance examination of the Lake Kienawisik area and prepared a report for the Mines Branch at Quebec.* It was in 1915 or 1916 that gold was discovered on the claims now held by the Siscoe Mining Syndicate on the largest island in Kienawisik Lake (or Lake de Montigny).

Apart from the work done on the claims of the Siscoe Mining Syndicate and on claims on the Southern Shore of Lake Kienawisik belonging to the Martin Gold Mining Company, which latter claims the writer did not have time to visit, there was practically no prospecting being done in the area during the war.

A blue print accompanying this report serves to show the claims that have been staked in the area and the relative location of those claims held by the Siscoe Mining Syndicate. This blue print was issued by the Mines Branch, Quebec on April 21st, 1919.

(*) See "Report on the Geology and Natural Resources of an Area embracing the Headwaters of the Harricana River, Northwestern Quebec." Report on Mining Operations in the Province of Quebec during 1912, pages 217-229.

GENERAL CONSIDERATIONS

Topography.—Lake Kienawisik (or de Montigny) is approximately 985 feet above sea-level. The island upon which the mineral claims of the Siscoe Mining Syndicate are situated rises to elevations of probably not more than 25 to 40 feet above the level of the lake.

Overburden.—Exposures of bed-rock comprise but a very small proportion of the area of the claims. The soil is a heavy tenacious clay which only locally contains scattered boulders. Much of the clay is stratified, it having been deposited within the waters of a very extensive lake that, geologically speaking, recently occupied "the Clay Belt" during the recession of the glacial ice-sheet. Over considerable portions of the island, the bed-rock lies at depths of from one to three feet below the surface, but in places the soil cover is known to exceed ten to twelve feet in thickness.

Timber.—The island is covered with a healthy growth of spruce, balsam and a few birch of dimensions suitable for timber in mining operations.

At the time when the writer examined these mineral claims, snow still lay in the bush, but had almost completely disappeared from open spaces. Hence the snow did not interfere with the examination of the discoveries of gold that had been made on these claims.

GENERAL GEOLOGY OF THE SISCOE MINERAL CLAIMS

The island on which the claims of the Siscoe Mining Syndicate are situated is underlain by a complex of more or less altered igneous rocks of the extremely ancient Keewatin in formation. The rock types in the vicinity of the veins have been determined by the writer in thin section under the microscope. The dark-gray and greenish-gray rocks which predominate on those portions of the island examined possess the composition of fine-to medium-grained diorites or andesites and diorite-porphyrates. In general, these rocks are quite massive but in places they have been sheared into hornblende schists. These darker rocks are locally cut by irregular dykes of lighter colour which possess the composition of quartz porphyries; some of these dykes are massive, quite fresh and fairly coarse-grained (as for example, the dyke of quartz porphyry in the vicinity of B shaft), while others have been much altered, as for example the irregular dykes of quartz porphyry to the northeast of D shaft. One dyke of aplitic character was observed towards the southern end of the island at a point where some prospecting work has been done.

MINERALOGICAL CHARACTER OF THE GOLD-BEARING VEINS

The gold occurs in quartz veins and stringers, the majority of which contain much tourmaline, while a little calcite, considerable disseminated pyrite and an occasional grain of copper pyrites are also frequently present. In at least one of the veins (viz. the "C" vein) widely scattered grains and small lumps of scheelite, the tungstate of calcium have occasionally been encountered.

If interested in the question of the origin of these veins, see page 219 of my report to the Quebec Government which has already been referred to in foot note on page 3 of the present report.

On succeeding pages, a detailed description is given of the veins which have been discovered on this property:—

Vein "A" — See large blue print of island.

Striking S. 60° W. and dipping 75° to 85° toward the southwest, this quartz vein has been laid bare by stripping for a length of 90 feet. Its total length has not been exposed, as at either end it passes beneath a comparative heavy soil cover.

Within its exposed length of 90 feet (see Plate II Fig. 1), the width of the vein varies from 7 to 22 inches; for twelve feet of its exposed length it splits up into narrow

braided stringers. For its total exposed length, its average width would not exceed 12 inches.

The vein traverses a dark, fine-grained, grayish-green andesite or diorite of Keewatin age which exhibits a tendency to schistosity.

At the northeastern end of its exposure, a pit, about 9 ft. x 12 ft., has been sunk to a depth of 7 or 8 ft. On the southwestern wall of this pit (see Plate II, Fig. 2) the width of the vein varies from 14 inches to 22 inches, but nine feet toward the northeast, in the floor of the pit, the width of the vein decreases to seven inches. This vein, as exposed in this pit, is much more heavily mineralized with pyrite than any other vein on the property; in addition to the pyrite, the quartz contains considerable tourmaline, a few scattered grains of copper pyrites and an occasional particle of native gold. Two samples taken in this pit and representing four cuts across this vein where it varies from 7 inches to 14 inches in width, at intervals of about two feet apart, were assayed. One of these samples yielding \$32.00 per ton in gold and 40 cents per ton in silver; the other sample yielded \$93.20 per ton in gold and the silver was not determined.

On the southwestern wall of the pit just referred to, two samples were taken representing about three feet in width of the country rock on the footwall side of and adjacent to the vein. When assayed, one of these samples yielded forty cents per ton in gold, while the second sample yielded only a trace of gold.

At distances of about 35 and 47 feet, respectively, toward the southwest from the pit referred to in the two preceding paragraphs, samples were taken across the vein which here possesses widths of 18 inches and 20 inches, respectively and contains only a few scattered grains of pyrite. The samples were combined into one sample which when assayed, yielded only forty cents a ton in gold.

The above results emphasize the irregular character of the mineralization in vein "A". At its northeastern end, assays of representative samples yielded \$93.20 per ton and \$32.00 per ton in gold; but 35 to 47 feet to the southwest, similarly representative samples yielded only forty cents a ton in gold.

At the southwestern end of its exposure, a pit has been sunk on this vein to a depth of 9 or 10 feet; at the time when I examined the property, this pit was partially filled with water.

"The \$100 Vein." — 150 feet, more or less, to the southwest of the pit, on the southwestern end of Vein "A" there is a narrow, crooked quartz vein which is known to Mr. Garbi, the Superintendent of the property, as the \$100 vein. It is exposed for a length of a few feet and at one end terminates in very narrow stringers. Although it locally expands to a width of 7 or 8 inches and is quite heavily mineralized with pyrite and has been found to contain a few specks of native gold, the vein was so narrow and irregular that no sample was taken.

"Vein B" — See large blue print of island.

On what is known as "B" vein on the property, a shaft has been sunk to a depth of 32 feet. When the writer examined the property, there was 20 feet of water in the shaft and the shaft was closely timbered from the surface to some distance below the water. In the vicinity of the shaft, the bed-rock is well exposed and it is plain that the shaft has been sunk close to the contact of a dyke of medium-grained quartz porphyry, 8 to 10 feet in width, traversing Keewatin greenstone. Adjacent to one contact of this dyke, the Keewatin greenstone for a width at the surface of not more than two or three feet is irregularly mineralized with pyrite. At the surface, there is nothing that warrants the application of the term "vein." An examination of the dump shows that in the shaft, the Keewatin greenstone was traversed by a few narrow and irregular quartz stringers. Mr. Siscoe told me that from the bottom of the shaft he had taken a sample which yielded \$4.25 a ton in gold and that when sinking the shaft, a picked sample yielded \$17.50 per ton in gold. In the opinion of the writer this occurrence is far too irregular to be of economic value.

Vein "C" or the Black and White Vein. - See large blue prin island.

This vein is known as the "Black and White Vein" because it has a more or less banded black and white appearance due to the arrangement of the very considerable amount of black tourmaline in the quartz in narrow streaks which trend more or less parallel to the walls of the vein. In addition to quartz, tourmaline, and irregularly scattered grains and "nests" of native gold, this vein contains very sparsely disseminated grains of pyrite and calcite, and an occasional grain of copper pyrites; the presence within the vein of a few scattered grains and small lumps of scheelite, (the tungstate of calcium) is of especial interest because this rather uncommon mineral is also present in some of the gold-bearing veins of the Porcupine District, Ontario.

Striking N. 12° E., and with an average dip of 35° toward the northwest, this vein traverses a medium-grained greenish-to bluish-gray rock possessing the composition of an altered diorite porphyrite.

A shaft (8½ ft. by 4½ ft.) (See Plate I, Fig. 1) has been sunk on this vein to a depth of 100 feet; for 16 feet below surface, this shaft slopes 75° when it assumes a slope of about 35° which corresponds to the average dip of the vein. To a depth of 38 feet, the walls of the shaft are closely timbered. When examined by the writer, there was 50 feet in depth of water in the shaft.

At a depth of 41 feet in the shaft, the vein is 13 inches thick on the right or northern wall of the shaft and 31 inches thick on the left or southern wall. A sample taken representing the true thickness of the vein on the northern wall of the shaft at this depth yielded \$8.00 per ton in gold and a trace of silver. Similarly, a sample taken representing the 31 inches in thickness of the vein on the southern wall of the shaft yielded only eighty cents per ton in gold.

At a depth of 47 feet in the shaft, the vein is 14 inches thick on the right or northern wall of the shaft and 13 inches thick on the southern wall. A sample taken representing the true thickness on the northern wall of the shaft yielded \$21.60 per ton in gold and a trace of silver. Similarly, a sample representing the 13 inches in thickness of the vein on the southern wall of the shaft yielded \$33.00 per ton in gold and a trace of silver.

At a depth of 41 feet, chips of the country rock were taken at irregular intervals across the roof of the shaft which here is from 12 to 18 inches above the vein. This sample when assayed yielded no values in gold or silver, showing that the country rock adjacent to the vein is barren.

In the bottom of the shaft, viz., at a depth of 100 feet, the vein is said to possess a true thickness of 22 inches.

The writer climbed over the ore dump at the mouth of the shaft and at random knocked off 100 chips from fragments of typical vein material. The whole sample thus collected weighed about ten pounds. The chips were examined and four of them which contained specks of native gold were taken out of the sample. On assay, the sample, after the four chips showing native gold had been removed, yielded \$6.60 per ton in gold and a trace of silver. This was the only instance in which any attempt was made to remove from a sample those fragments containing free gold.

In the immediate vicinity of C shaft, no rock outcrops and no stripping has been done. About 70 feet to the southwest and in the direction of the strike of the "C" vein trenching has exposed a vein which is presumably a continuation of "C" vein with a width of outcrop of 14 inches, which displays scattered grains of free gold on its surface. About 50 feet further toward the southwest, viz., 120 feet from "C" shaft, trenching to a depth of from two or three feet has exposed a quartz vein, presumably a further continuation of "C" vein, rich in tourmaline, with a width of outcrop of 5 1/2 feet. Since the vein is here dipping about 35°, its thickness is about 30 inches. A sample taken across the 5 1/2 feet width of outcrop of this vein yielded \$4.00 per ton in gold and a trace of silver. (c) The writer left instructions with Mr. Garbi, the

(c) Owing to the difficulty under which this sample was obtained, the writer does not consider it to be as representative as other samples taken.

Superintendent of the property, to strip to bed rock between "C" shaft and the trenches referred to in order to definitely ascertain whether the veins exposed in the trenches are in reality a continuation of "C" vein.

In the opinion of the writer, this "C" vein is the best vein that has been discovered on the property. Its dimensions as seen by the writer, vary from 13 inches to 31 inches in thickness; its length has not yet been determined. Native gold is very irregularly distributed within the vein as is shown by the variations in the above assay results from eighty cents per ton to \$33.00 a ton. Numerous very spectacular specimens have been taken from the shaft on this vein. Frequently nests of gold have been encountered which when freed from the quartz constitute specimens which veritably are irregular nuggets of gold. In a few instances, these "nuggets" have weighed several ounces.

The "D" Vein Zone — see large map of island on tracing linen.

What is known as the "D" vein is in reality a wide zone within which very irregularly dispersed stringers of quartz traverse Keewatin greenstones, possessing the composition of an andesite or fine-grained diorite. In a few places, irregular dykes of light gray quartz porphyry, a few feet in width, traverse the greenstone.

The quartz stringers are very irregularly dispersed. Individual stringers are rarely more than a few feet or yards in length; seldom do they exceed a few inches in thickness, although some of them locally widen to 18 inches. Black needles of tourmaline are present in a large number of these stringers. In some of the narrower veinlets or stringers, the tourmaline predominates over the quartz. In some instances, irregular disseminated grains of pyrite and occasionally some calcite is present in the quartz.

Although individual veinlets or stringers are often crooked and very irregular, their general strike within this zone is N 12° E and they dip to the southeast, usually at low angles. Stripping has shown these stringers to be widely and irregularly scattered within a zone at least 470 feet in length and 150 feet in width.

Several of these quartz stringers carry variable values in gold. In some instances they have been found to contain "nests" or "pockets" rich in free gold from which spectacular specimens may be taken. Very remarkable specimens of quartz carrying abundant free gold have been taken from "D" shaft.

"D" shaft (see Plate I Fig. II) has been sunk at a point where three or four irregular quartz veins or stringers traverse the Keewatin greenstone. The veins dip at irregularly low angles toward the southeast. The shaft is inclined 55° toward the southeast and thus, dipping more steeply than the veins, passes beneath those veins upon which it started. The shaft is said to be 75 feet deep but at the time of my examination it was filled with muck and water to within about 20 feet of the surface.

On the northern wall of the shaft, within a width of 10 feet, there are three bluish-gray quartz veins or stringers which are 10 inches, 4 inches, and 9 inches, respectively in width and are separated from each other by 44 inches and 54 inches, respectively, of country rock. Numerous minute veinlets of quartz branch off from these veins. Plate III, Fig. 3, is a very poor photograph of the northern wall of this shaft.

A sample representing four cuts across each of these veins yielded \$7.00 per ton in gold. A sample of the country rock taken across the full width (viz. 17 1/2 ft.) of the northern wall of the shaft, and omitting the quartz veins included in the preceding sample, yielded only a trace of gold, showing the country rock to be barren.

If the above sample representing the quartz veins had been taken in some places across the opposite wall of the shaft, much higher values for the gold content would have been obtained since one of the quartz veins exposed on that wall contains spectacular nests of native gold.

About 90 feet in direction N 22° E, a pit has been sunk to a depth of 3 or 4 feet. On the northeastern wall of this pit, a white quartz vein containing abundant needles of black tourmaline locally swells to a width of 12 inches. Because this is one of the widest quartz stringers in the "D" vein zone and because of its proximity to "D" shaft

a sample was taken, representing two cuts across this vein, which yielded only forty cents per ton in gold.

Approximately 270 feet S 10° W of shaft D, a shallow trench has exposed four quartz veins within a width of 17 feet across their strike. These veins are locally 18 inches, 6 inches, 8 inches, and 11 inches in width, respectively. Plate III, Fig. 1 shows three of these veins as exposed on the southern wall of this trench. Of two samples representing two cuts across these four veins, one yielded \$1.00 per ton in gold and the other forty cents per ton in gold. A sample representing a continuous cut across the 13 feet in width of country rock between the veins yielded only a trace of gold, showing the country rock to be barren.

Unfortunately, no place has been discovered within the D zone where the quartz stringers are close enough together and contain sufficiently uniform gold values to be worked profitably.

OTHER FEATURES OF INTEREST

At a point in the bush a short distance to the right of the trail leading from "C" shaft to "A" vein two loose boulders have been found which display abundant particles of free gold on their surfaces. The larger of these boulders was 39 in. x 17 in. x 23 in., and would probably weigh 1700 or 1800 lbs; its base was not exposed.

At a number of points in the vicinity of the D vein zone, the clay adjacent to the bed rock has been found to contain a little free gold. Considering the heavily glaciated character of the bed rock when exposed and the glacial and lacustrine character of the overlying clay, the writer would be very much surprised if gold were found in payable quantities in the clay. About 110 feet southeast of the "Office" at the foot of a large birch tree, there is a small pit from which it is said that a former cook had washed considerable gold in his spare time. A sample of chips representing a small heap of rusty decomposed rock that had been taken from the pit yielded only a trace of gold.

BRIEF SUMMARY AND CONCLUSIONS

(1) The writer was disappointed (a) in the narrow dimensions of the veins that have been discovered on this property and (b) that the assays of the country rock immediately adjacent to the veins yielded no values in gold.

(2) Some of the veins and stringers discovered on the property notably veins "A" and "C" and some of the veins in D shaft locally carry remarkably high values in gold; the mineralization is irregular.

(3) The veins may be expected to show the same irregularities in depth as they do when traced along their length of outcrop.

(4) The veins have been formed under deep-seated, high temperature conditions and since their formation, the area has been so worn down by prolonged processes of erosion that the veins have been deeply truncated. The veins traverse extremely ancient rocks.

(5) The D vein zone includes a vast number of widely scattered irregular veins and stringers of quartz which rarely exceed a few feet or yards in length. These individual veins and stringers are usually only a few inches in width, in a few instances locally expanding to a width of 18 inches. The gold content is extremely variable. In a few instances nests or pockets containing native gold yield spectacular values. In the opinion of the writer, no place has as yet been discovered within the D vein zone where the quartz stringers are close enough together and contain sufficiently uniform gold values to enable them to be worked profitably.

(6) The occurrences at "B" shaft and "the \$100 vein" are not considered to be of sufficient promise to warrant further work, unless it be stripping in their vicinity to ascertain if better veins may be discovered.

(7) Vein "A" has been exposed by stripping for a length of 90 feet. At either end of this exposure, the vein passes beneath an increasingly heavy blanket of soil. In its exposed length of 90 feet, the vein varies from 7 to 22 inches in width and has an average width of 12 inches. Assays of these samples taken yielded \$32, \$93.20 and forty cents per ton, respectively. Stripping or trenching should be done to determine true length and dimensions of this vein.

(8) The "C" or "Black and White" Vein is the best vein that has been discovered on the property. A shaft has been sunk to a depth of 100 feet on a slope of 35° which corresponds to the dip of the vein. The shaft is closely timbered to a depth of 38 feet and when examined by the writer there was 50 feet of water in the shaft. Between depths of 38 and 50 feet, the vein varies from 13 to 31 inches in width, with an average width of about fifteen inches. At bottom of shaft, vein is said to have true thickness of 22 inches. At depths of 41 and 47 feet four samples were taken across the vein and yielded eighty cents, \$8.00, \$21.60 and \$33.00 per ton in gold. At distances of about 70 and 120 feet southwest of the shaft trenches have exposed what is presumably the continuation of this vein; in the first of these trenches, the vein is 14 inches in width and contains considerable visible gold; in the second trench, the vein has a true thickness of about 20 inches and a roughly taken sample across the vein yielded \$1.00 per ton in gold. Stripping should be done to establish definitely whether the veins exposed in the trenches are the continuation of C vein and stripping should be extended in either direction from C shaft to determine the length and dimensions of this vein. At the same time, it would be advisable to sink C shaft to a depth of at least 150 feet and drift in either direction.

(9) The above remarks pertaining to work that it is advisable to perform on "A" and "C" veins have been made with the understanding that you can secure a reasonable working option on the property. In carrying on such work, the chief hope would lie in the possibility that systematic stripping and trenching might lead to the discovery of gold-bearing veins of larger dimensions than those that are known. Such stripping and trenching should be carried on across the northern portion of the island in a direction at right angles to the general trend of the majority of the known veins which strike N 22° E (magnetic). In performing this work it would seem well to try using stumping powder to clear ground of stumps and a team of horses with plough and scraper to remove the clay overburden. Likewise, further work, as outlined, on the "C" and "A" veins might prove them to be of such lengths average widths and average gold content that under proper management they might develop into modest remunerative gold mines.

Yours faithfully,

J. AUSTEN BANCROFT,

Professor of Geology, McGill University.

Montreal, Canada.

INTRODUCTION TO REPORT

BY

Professor JOHN W. BELL and Mr. JOHN A. DRESSER

Mining Engineers of Montreal.

Following the examination of the Siscoe Properties by Professor J. Austen Bancroft in May, 1919, Mr. Melkman decided to engage the services of Messrs. Bell and Dresser for the purpose of making a further examination especially in regard to the possibilities of the "D" zone. Readers will note that Messrs. Bell and Dresser place a higher prospective value on this zone than does Dr. Bancroft. It should be noted, however, that Dr. Bancroft was unable to make a thorough examination of the "D" zone shaft as it was full of water at the time he was there.

S. E. MELKMAN.

Montreal, July 31st, 1919.

Mr. Saul E. Melkman,
605 McGill Building,
Montreal.

Dear Sir:—

The following report combines the results, observations, and conclusions of the undersigned (John A. Dresser, Mining Geologist, and John W. Bell, Associate Professor of Mining, McGill University) following their examination of the mineral claims of The Siscoe Mining Syndicate.

The location of the claims, history of the district, general considerations and mineralogical character and description of the ores, are so well and correctly described by Dr. J. A. Bancroft in his report to you, as to make repetition unnecessary.

We will therefore merely describe in detail the results obtained by a more thorough sampling of the various exposures than was done by Dr. Bancroft, for the reason that the shafts were half, or more than half full of water at the time he visited the property.

"A" VEIN.

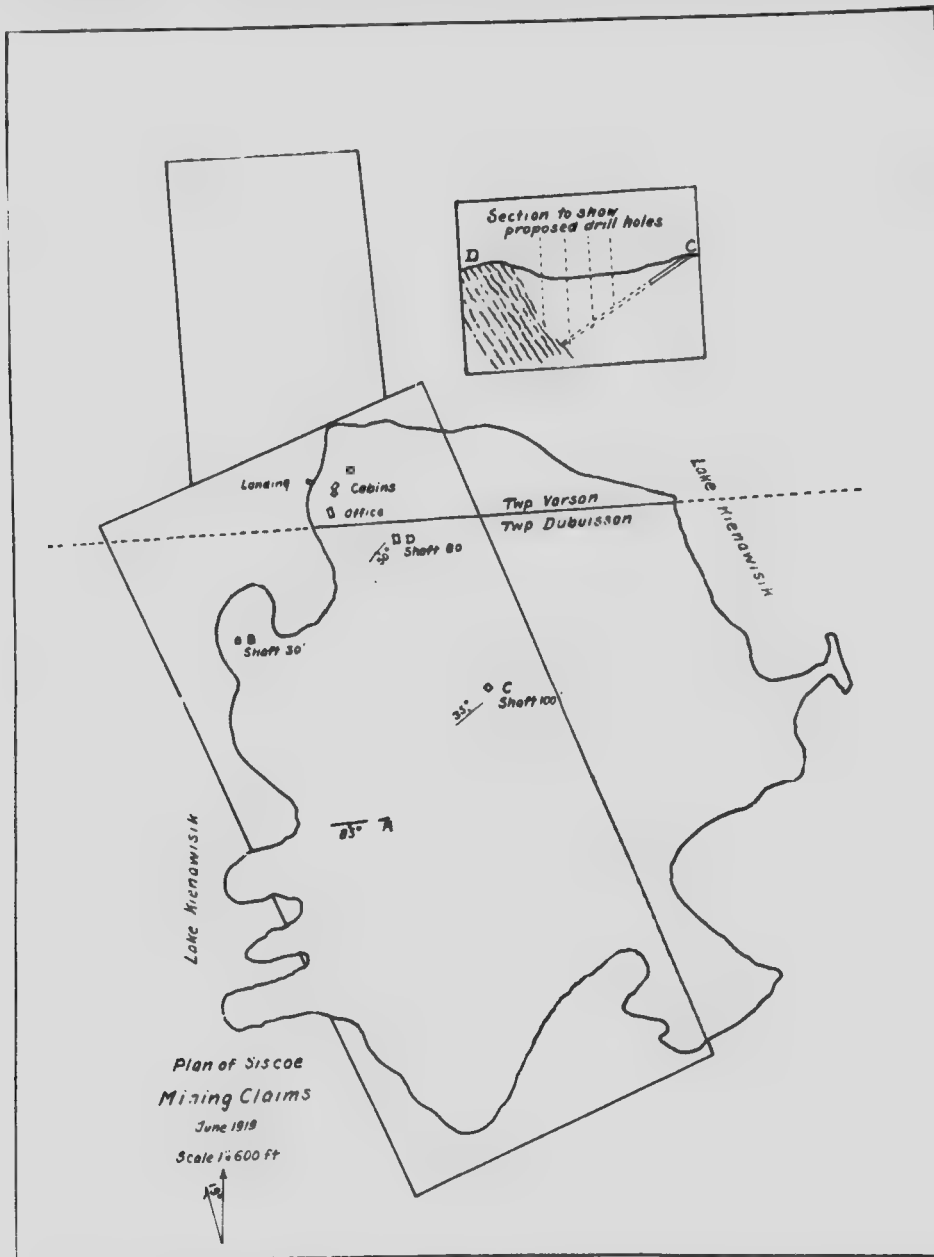
Some additional work has been done on this vein since Dr. Bancroft made his examination. At the time the first samples were taken by the undersigned, the shaft at the N.E. end of the stripped part of the vein had been sunk to a depth of about 20 feet. Samples were taken at 9 and 14 feet below bedrock, at both the N.E. and S.W. ends of this shaft.

The results obtained were as follows:—

Description of Samples	Depth in Feet	Width in Inches	Gold Value Per Ton \$	Dollar-Inches
N.E. End	9'	12"	\$60.40	\$724.80
Do.	14'	15"	\$18.40	\$276.00
S.W. End	9'	14"	\$ 9.60	\$134.40
Do.	14'	11"	\$22.60	\$241.00
Total		52"		\$1379.40
Average		13"	\$26.50	

At about 20 feet in depth, a slip came in which squeezed the vein down to a quartz stringer about two inches in width. A sample of this stringer contained only \$0.10 per ton in gold, but the pyrite which is such a distinguishing feature of the high

grade ore in this vein was completely absent. The probability of this being only a local condition was so obvious, that we recommended that sinking be continued, which was done. A recent examination and sampling of this vein showed that the pinched condition continued downward for about 6 feet, after which the vein widened to 9 inches. At the bottom of the shaft, 34 feet below the bedrock, the vein was about 12 inches in



width. A sample cut across 9" of quartz on the W. side of the shaft contained \$3.10 in gold per ton. This sample was taken 29 feet below bedrock. A similar sample on the E. side contained \$13.60 per ton. A sample across 12" of quartz near the bottom contained \$2.80 in gold per ton. Restoration of the good values found higher up would in all probability be obtained by further sinking.

"B" SHAFT.

This 30 foot shaft was sunk on a porphyry dyke. A sample of the dyke cut across its full width (4½ feet) contained \$0.80 per ton. A sample cut across FOUR FEET OF COUNTRY ROCK adjacent to the dyke was found to contain \$2.40 in gold per ton.

"C" VEIN.

The stripping recommended by Dr. Bancroft was completed and the continuity of the vein established.

On account of the upper part of the "C" shaft being timbered, no samples could be taken between the surface and 45 feet in depth. The lower part of the shaft was sampled thoroughly on both sides, the sample interval being 5 feet.

The sample number, position in the shaft measured from bedrock, width sampled and gold value per ton, are shown in the sketch on the following page 4. The average value for each side and the average for the two sides will be found on P. 5.

It should be noted that in only one of the above samples was a metallic particle of gold found on the sieve, in the course of the preparation of the assay sample. This shows that the gold value in these samples is practically all in the form of fine free gold (at least finer than the opening in a 90 mesh sieve opening) or else contained in the sulphides, of which there is a noticeably small amount. Since therefore as described by Dr. Bancroft, nuggets or nests of gold were found during the sinking of this shaft, a no doubt appreciable value should be added to the general average of all the samples (\$17.40) in order to arrive at the actual value of the ore taken out. No accurate figures are available but it is probable that from \$5.00 to \$10.00 might be added to the \$17.40 average, in estimating the average value of the ore removed from the shaft.

AVERAGE VALUES "C" SHAFT

NORTH SIDE.

Depth Feet	Width Inches	Gold Value Per Ton	Dollar-Inches
45	10	\$ 4.40	\$ 44.00
50	12	7.80	93.60
55	13	38.70	503.10
60	15	21.40	321.00
65	15	78.00	1170.00
70	16	51.50	824.00
75	16	5.10	81.60
80	17	6.10	103.70
85	15	114.00	1710.00
90	17	1.80	30.60
95	23	2.40	55.20
Total	169		\$4926.80
Average	15.4	\$28.00	

SOUTH SIDE.

45	27	\$ 7.80	\$ 210.60
50	21	9.60	201.60
55	17	15.20	258.40
60	12	10.20	122.40
65	17	6.30	107.10
70	14	7.20	100.80
75	12	8.00	96.00
80	12	4.80	57.60
85	13	2.40	31.20
90	16	1.90	30.40
95	21	0.50	12.00
Total	185		\$1223.10

"C" Shaft Samples.

North Side

South Side.

North Side			South Side		
Vein			Vein		
S.No.	Width		Width	S.No.	
#15	10"	\$ 4.40	\$ 7.80 27"	#14	
#16	12"	\$ 7.80	\$ 9.60 21"	#13	
#17	13"	\$ 38.70	\$ 15.20 17"	#12	
#25	15"	\$ 21.40	\$ 10.20 12"	#11	
#24	15"	\$ 78.00	\$ 6.30 17"	#10	
#23	16"	\$ 51.50	\$ 7.20 14"	# 9	
#22	16"	\$ 5.10	\$ 8.00 12"	# 8	
#21	17"	\$ 6.10	\$ 4.80 12"	# 4	
#20	15"	\$114.00	\$ 2.40 13"	# 3	
#19	17"	\$ 1.80	\$ 1.90 16"	# 2	
#18	23"	\$ 2.40	\$ 0.50 24"	# 1	

SOUTH SIDE.—(Continued)

Average	16.8	\$ 6.65	
North	169		\$4936.80
South	185		\$1228.10
Total	354		\$6164.90
Average	16.1	\$17.40	

"D" ZONE SHAFT.

On account of the irregularity in the network of stringers traversing the country rock, we concluded that a more reliable idea of the values disclosed by "D" shaft would be gained by shipping a few large bulk samples to McGill University Ore Dressing Laboratory. The first two samples were sampled by successive crushing and quartering. A mill test was made on the third. The results obtained were as follows:—

Bulk Sample No. 1.

Weight 9.3 Tons. The sample was taken at the bottom of "D" shaft, 73 feet from the surface.

Gold Value per Ton \$2.50

Bulk Sample No. 2.

Weight 2.7 Tons. This sample was taken in the shaft at a point 42 feet from the surface.

Gold Value per Ton \$1.85

Bulk Sample No. 3.

Weight of Sample 8.3 Tons. This quartz was sorted out from the mixed quartz and wall rock in the upper part of "D" shaft. A small amount of this quartz contained visible gold. Most of it consisted of clean quartz showing no visible gold. The sample was crushed in the stamp mill and amalgamated with the following results:—

Gold Bullion Recovered	17.0 oz.		
Fineness	0.840		
Fine Gold Recovered	14.3 oz. @	\$20.67	\$295.58
Battery Residues	0.08 Ton @	\$27.40	2.19
Tailings	8.22 Tons @	\$3.80	31.24
			\$329.01
Gold Value per Ton		\$39.64	

A concentration test was made on a sample of the stamp battery tailings, to ascertain if the sulphides in the quartz carried appreciable gold values. The ratio of concentration indicated by the test was about 50: 1 assuming as no doubt was the case that not more than 75% of the mineral in the ore was saved on the table (Wilfley). The rough concentrate contained \$48.00 in gold per ton. Probably the clean concentrate would run at least \$100 per ton. Of course the ratio of concentration would be higher, probably 100 tons of ore to 1 ton of concentrate.

It is the opinion of the writers that the most promising field for prospecting is the "D" zone. Probably the high values in the small veins such as "A" and "C" are related or connected in some way with this zone. It is proper to point out that if large ore bodies could be disclosed in this area, it is probable that they could be worked very profitably even if they carried only \$1 to \$5 per ton, because it is more than likely that further concentration tests on this kind of ore would point to the feasibility of employing a much simpler and less expensive treatment process than all-sliming follow-

ed by cyanidation such for instance as simple grinding to 40 mesh, amalgamation, flotation, to recover high grade concentrates, and a small all sliming cyanide plant to treat the relatively small tonnage of high grade concentrate produced from a large tonnage of low grade ore. This aspect of the situation is worthy of considerable attention and experimentation.

It is proper to point out also in connection with the rather low values found in the bulk samples in the lower part of the shaft, that the shaft passed through some relatively (to the stringers lower down in the shaft) large stringers in the upper part of the shaft. In the lower part of the shaft the quartz stringers are very small but fairly numerous. Now as pointed out by Dr. Bancroft, the quartz stringers while they are quite irregular as might be expected in a shear zone of this nature, appear to lie at rather a low angle, consequently the shaft which was sunk at a fairly steep angle may have passed into a lower portion of the zone than was the case where the shaft was commenced near the surface. Nothing but a crosscut or the putting down of some diamond drill holes would permit the statement of a definite conclusion in this regard. The mill test was as before stated made on quartz sorted out from these relatively larger and better grade stringers near the surface where the shaft was started, and the test of course shows a very satisfactory value to be contained in this quartz, remembering of course that the proportion of country rock mined with this quartz was thrown to one side.

On examination of low grade bulk sample material, it was evident that the wall rock or country rock carried quite appreciable quantities of sulphides (iron, pyrite, etc.). In fact there appeared to be a greater percentage of sulphides in the wall rock than in the quartz on a ton for ton basis so that when it is considered that these samples contained probably at least ten times as much wall rock as quartz stringers, it is clear that the concentrates obtained from a representative sample of the bulk sample would be derived mainly from the country rock. It therefore seemed important to ascertain what the grade of such a concentrate would be. A 500 pound sample of Bulk sample No. 1 was cut out, crushed in a Huntington Mill and the sands treated on a Wilfley Table. The rough concentrate from the Table was panned so as to secure as nearly clean concentrate as possible. The clean concentrate was then assayed and it was found that it contained 3 ounces of gold (Value \$60.00) per ton of concentrate. One is therefore compelled to reach the conclusion that much of the mineral at least in the country rock proper has been deposited or enriched by the gold-bearing solutions. No accurate data was obtained in this rough test regarding the ratio of concentration.

This test however suggests that if portions of the "D" zone can be found where shattering and associated factors were favorable to heavy mineralization, it is probable that such portions would contain ore of a good grade. In short that there is, in all probability, a fairly reliable relation between the amount of mineral and the gold values. This kind of relation appears to hold also in the "A" vein.

No doubt the \$2.40 gold value found in the 1 foot sample of country rock adjacent to the dyke in "B" shaft would be found to be contained for the most part in a small quantity of sulphides of good grade. From the general appearance of this sample, it would have occasioned no surprise if the assay had indicated only a trace of gold. The possibility of development proving up a very large deposit of perhaps medium or low grade ore is suggested by the large area, (most of which is covered with boulder clay and consequently its potential possibilities remaining unknown) indicated by the four known places where appreciable and in some cases very appreciable gold values have been disclosed.

SUMMARY

VEIN A in the first 15 feet of the shaft shows an average value of \$26.00 per ton in a vein 13 inches wide (see P. 2).

VEIN C in the shaft between 50 and 100 feet in depth averages \$28.00 per ton in a vein of 15 inches, on the north wall. On the south wall the value in the same inter-

val is \$6.70 for a width of 17 inches, the average value of both walls being \$17.40 over 16 inches. (see P. 5). Some spectacular ore was taken out during the sinking of this shaft, but of the 22 samples from which the above average was obtained, free gold could be detected in only one. This vein dips towards zone D at an angle of about 40°.

ZONE D is a network of quartz stringers in varying amount extending over an area perhaps 200 feet wide and 100 feet or more in length. That some very rich ore occurs here is evidenced by the fact that a mill run of 8.3 tons of selected ore yielded \$295.58 in bullion. The tailings averaged \$3.80 per ton, making a total value of \$39.61 per ton.

Some of the ore in this lot contained an appreciable amount of visible gold. On the other hand a sample of 9.3 tons taken from the bottom of the shaft—about 75 feet, yielded an average of \$2.50 per ton. A large part of this sample, probably 90 % consisted of country rock. (See P. 6).

The stringers dip with some regularity towards Vein C.

SHAFT B.—It is of interest at least to note that a sample taken across a width of four feet of country rock adjacent to a porphyry dyke, which appears in this shaft contained \$2.40 per ton in gold.

The four points A, B, C, and D, are approximately one thousand feet apart and, roughly speaking, form the corners of a square. The ground between them is drift covered and almost unknown.

CONCLUSIONS

The property is still in the prospect stage. As noted above, good values have been found at three places, one thousand feet apart, A, C, D., and low but appreciable values are indicated in Zone D, although only a limited amount of development work has yet been done.

While the high grade ore has not thus far been found in sufficient quantity, nor the low grade to be of sufficient value, to assure profitable operation, the prospective value as indicated above is sufficient to warrant undertaking further development work, especially taking into consideration the fact that the network of stringers in D zone and the C vein itself dip towards each other, the possibility of their being related is a matter which merits exploration. This work should be concentrated on the area between C and D and on the D Zone. It would be most economically done in the first instance by diamond drilling, say to the amount of three or four thousand feet.

JOHN W. BELL.

JOHN A. DRESSER.

REPORT ON SULLIVAN GOLD PROPERTIES

BY

Professor J. AUSTEN BANCROFT

INTRODUCTION by Mr. S. E. MELKMAN.

During an extensive examination made by Prof. J. A. Bancroft of the Harricana Mining Region, on behalf of the Provincial Government, he made a thorough inspection of those mining claims which were then being developed by Mr. J. J. Sullivan, and his report follows verbatim. Since then Mr. Sullivan has opened up the ground to a much greater extent, but owing to the difficulties encountered in financing his operations, the claims in question remained idle until further important discoveries in the immediate vicinity attracted attention to the Sullivan concessions. The British Minerals Corporation Limited has now secured these properties for the purpose of development and exploitation.

SULLIVAN'S CLAIM

This claim is situated on the eastern shore of Kienawisik lake, about four miles southward from its outlet. It was located on July 11th, 1911, Messrs. J. J. Sullivan and Hertel Autnier discovered gold within a quartz vein exposed upon the shore of the lake.

Upon this claim a low rocky knoll protrudes from beneath the stratified clays, descending toward the east into a swamp. The granodiorite of which this hill is composed is similar in appearance to that exposed at the southern end of Blouin lake and at the first and third portages en route to Atikamek lake; but less quartz is present in this rock, which is subject to minor variations in texture within a very small area. It usually displays a more or less definite tendency to a gneissoid structure, the crystals of feldspar occasionally appearing as small imperfectly formed augen, as if the rock originally has been porphyritic in part. A typical specimen of the rock when examined in thin section under the microscope was found to consist chiefly of chlorite and plagioclase with small amounts of quartz and orthoclase, disseminated grains of black iron ore and sphene and minute crystals of apatite and zircon. The chlorite has been derived from the alteration of probably both biotite and hornblende. A considerable amount of calcite is present, replacing chiefly some of the feldspar and chlorite. The plagioclase, which proved to be between albite and oligoclase, is altered more or less to minute flakes of sericite. The particles of sphene are partially changed to calcite and leucoxene. Very little quartz is present, occupying the interstices where it is micrographically intergrown with feldspar.

At the time of this examination, the widest vein on the property was that where the first discovery was made. This vein strikes nearly east and west, with a very steep dip toward the north. At the bottom of a shaft, about ten feet deep, which had been sunk so close to the margin of the lake that it is flooded during high water, the dip becomes very nearly vertical.

It was on June 21st that the water of the lake had subsided sufficiently to permit an examination of this shaft. The vein has a maximum width of eighteen inches where it appeared from the water at that time. The shaft is about eight feet farther eastward. On the west wall of the shaft the vein is sixteen inches wide; on the east wall, six inches; but at the bottom another stringer of quartz, four inches in width, appears toward the northern face. By stripping, the vein had been exposed for 50 feet eastward from the shore, where it tapers into a crack which is black with tourmaline. Eastward from the shaft, it varies from three to ten inches in width. It is well mineralized with pyrite, a little chalcopyrite, galena and zinc blende, and a few specks of native gold. In places the quartz is dark in colour because of the abundance of tourmaline. **An assay of a picked sample, showing no free gold upon its surface, which was taken from the dump, yielded \$118.00 per ton in gold.** An assay of fragments, representing the complete width of the vein at the bottom and on the western wall of the shaft, yielded \$15.80 per ton in gold. A sample, representing the complete width of quartz on the eastern wall of and at the bottom of the shaft, returned \$6.20 per ton in gold. A large sample of the country rock immediately adjacent to the vein did not yield a trace of gold.

About 250 feet southward from this vein another quartz vein, striking nearly west to east, had been exposed for a distance of about twenty-five feet, where it displayed a maximum width of ten inches. Irregular in width and tapering to a small stringer at the eastern end of the exposure, this vein contains more tourmaline than the one just described and a few specks of pyrite and chalcopyrite. The marginal portions of the vein are, in places, very nearly pure tourmaline. For a few feet the enclosing granodiorite has been brecciated in small fragments, which are now distributed through a matrix of quartz and tourmaline, the latter mineral predominating. Adjacent to the vein, the granodiorite is much sheared, and up to a distance of three feet from the vein contains a few large cubical crystals of pyrite. One of these crystals was observed to be two inches across the side. Some of them contain a little quartz irregularly disseminated through the pyrite. Two of these crystals, when assayed, returned \$33.00 per ton in gold. Eastward about 200 feet and in direct line of strike with this vein, where a low bluff of granodiorite rises, a quartz vein is exposed, starting towards the top of the outcrop as a mere fracture lined with tourmaline and widening to six inches where it passes beneath the overburden. Very rich in tourmaline, a few specks of native gold were found within this vein.

In many other places the granodiorite was observed to be traversed by small veins of similar character, none of which possessed a width greater than ten inches. In most instances it was plain that they were mere stringers appearing and dying out within a few feet or yards.

Mr. Sullivan informs me that toward the southern end of the property he has since found a brecciated vein, which is apparently more important than others yet discovered. He also tells me that the vein exposed upon the shore has been found to appear at intervals along its strike for six hundred feet to the eastward.

(Extract from Prof. Baneroff's main report addressed to the Minister of Mines, at Quebec, Canada)

REPORT ON THE SULLIVAN PROPERTIES

REPORT ON MINING LICENSES NUMBERED 783, 784 & 1069

LAKE KIENAWISIK, P. Q.

BY

JOHN E. HARDMAN, M. E.

OF MONTREAL, QUE.

LOCATION AND TITLE

The property offered is situated in the Township of Dubuisson, County of Temiscouingue, Province of Quebec. It lies 34 miles south-south west of the town of Amos, on the Transcontinental Railway, whence it is reached by boat trip of 42 miles up the Harricaw River.

There is no wagon road to the claims, hence transportation is difficult for about six weeks in the spring and fall. There are three (3) adjacent claims each of 80 acres, making a total of 240 acres covered by the option. Each claim is 40 chains long in a north and south direction by 20 chains in width, the whole covering an area of one-half a mile north and south, by three-quarters of a mile east and west; the prevailing direction of the veins is north-north east by south-south west.

I am informed that the titles are all valid, the annual dues having been paid to the Government. The annual dues on each claim are \$50.00, or \$150.00 for the whole area.

N. B. — The claims are all patented now.

GEOLOGY

Claim No. 783 is the most westerly and has about 60% of its area under the waters of the lake; the shore line of this claim and No. 784 show the country rock to be an altered granite (eruptive) in which most of the mica has disappeared leaving a rock called a "granite porphyry" or grano-diorite. On claim No. 1069, the one farthest south, this grano-diorite is replaced by the greenstones of the Keewatin, occasionally schisted.

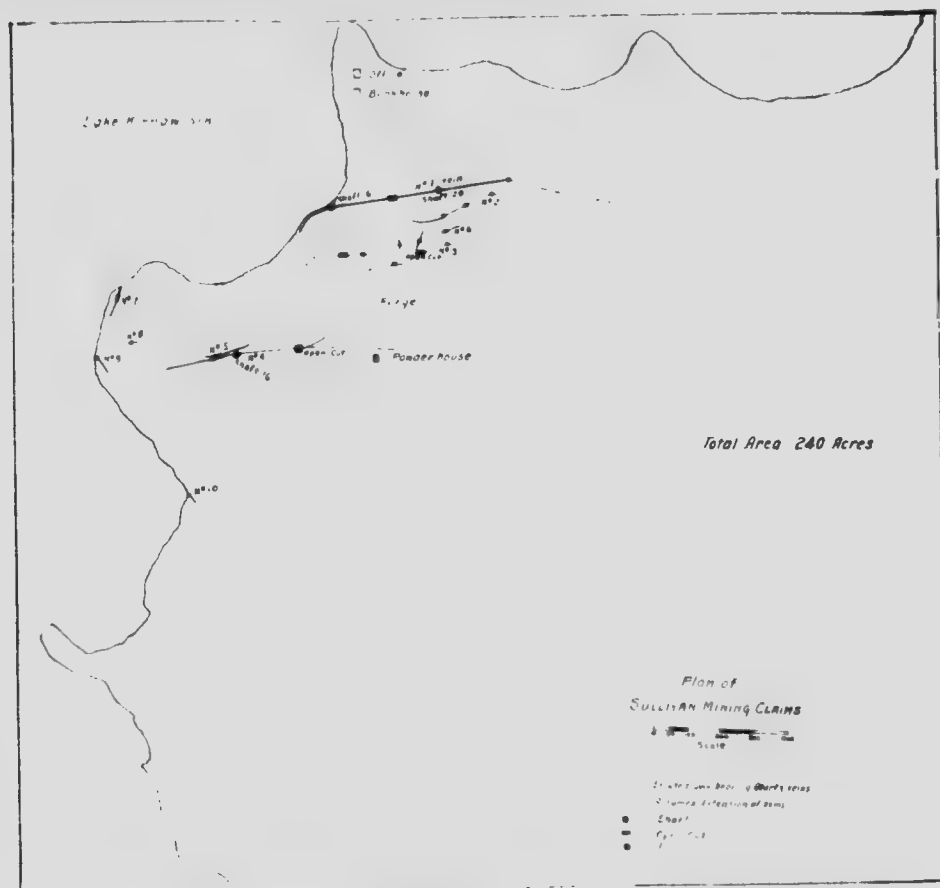
On the point where the cabins are, the shore shows a dark porphyry with phenocrysts of feldspar; the grano-diorite is penetrated in places by this porphyry, it is therefore probable that this region has been subjected to considerable plutonic influences with the consequence that valuable deposits of metallic minerals may reasonably be expected.

The topography of the claims is that of a narrow foreshore from one to five feet above the lake, followed by a steep rise, on claims No. 783 and No. 784, to a height of 60 to 70 ft. on the north and north-west portion; to the south-east the general elevation is not more than 20 to 25 feet above the lake waters.

VEINS

Some ten (10) different veins, or croppings of mineral-bearing rock, have been found on these claims up to the date of this report. The strike of the veins varies from due east and west to north 70° west, two small outcrops (Nos 9 to 10) run north-west.

Veins 1, 2, 3 and 6 are opened principally on No. 784, the others lie entirely within claim No. 783, so far as they have been traced. These veins appear to occupy shear-zones cutting the grano-diorite. Samples from 1, 2, 3, 4 and 9 were cut and crushed and panned for free gold, all of them showed some fine, free gold, one or two giving tails indicating values from \$10. to \$15. to the ton.



No. 1 VEIN is the original "discovery" vein of this region found in July 1911 from a quartz boulder on the lake shore. By clearing away the boulders a shear zone, about 2 feet in width was uncovered containing 12 to 14 inches of quartz and about 10 inches of slate or crushed country rock. The quartz is reddish, being stained with iron rust, carries a small percentage of cubic iron pyrites which are auriferous. On panning the quartz gives a good tail of fine metallic gold; by fire assay the value was \$6.00 per ton.

The general course of No. 1 vein is north 80° east, but, when followed to the east, maintains a straight course for only a short distance, bending to the north again before resuming the regular course; this deflection to the north appears to occur regularly and accounts for the shallow shaft (sunk to a depth of 18 ft.) sunk some 400 feet from the shore line not cutting the quartz.

The outcrop curves round a bend in the shore line before starting to run inland; near the shore (some 25 ft. therefrom) a pit was put down to a depth of 10 feet in 1912, and values are said to have been obtained averaging \$33.00 to the ton, which is not improbable, but the best value I obtained from the upper workings was \$6.00. This pit was filled with gravel and rocks washed into it from the lake during heavy winds from the west. To the eastward of this shaft the surface gets deep and the outcrop has not

been uncovered; about 60 ft. easterly the hill rises abruptly to a height of about 66 feet, and on the brow of this hill some trenching has been done, but, in my opinion, is too far to the south to have caught the real vein and the stringers found are not the real No. 1 vein. A shaft located 50 feet easterly from the pit on the shore, just at the base of the bluff, would be free from the lake wash, would be most favorably situated in respect to the camp and should have been started.

I was impressed with the character of this vein very favorably and am of the opinion the development will show it to be of larger dimensions than appear on the surface; it is also probable that values will be high, at least up to two figures.

VEIN No. 2.—This is an irregular, erratic happening of quartz segregation in the granodiorite, without commercial importance at present and only noticeable from the rare occurrence of metallic gold in the mineral *tourmaline*; my sample from it assayed \$5.40 but it was only 3 inches wide.

VEIN No. 3.—This is the most promising vein on the property. Like No. 1 occupies a zone of sheared rock which has widths varying from one to three feet, it carries the bulk of its width in quartz which has pyrite and a little copper pyrites scattered thro it, it pans some fine gold wherever it is sampled. Its general course is due east and west; it has been uncovered or traced for a length of 150 feet, and at a distance of about 400 feet from the shore line a pit has been put down to a depth of 7 feet, exposing about 2 feet of hard, iron stained quartz and 1 foot of schisted rock which carries a large percentage of sulphides. All of this material pans well in free gold. The quartz assayed \$24.80, the schist \$6.00.

Ten feet to the westward the outcrop assayed \$6.00. Forty feet to the west a sample gave by fire assay \$18.80, over a width of 18 inches. This vein is well worth developing.

VEIN No. 4.—The deposit called vein No. 4 lies 300 feet south of No. 3.

Its character is rather obscure, but appears to occupy a shear zone, or rather a space between two shear planes, and to consist of mineralized rock rather than quartz. The outcrop shows great variation in width from a mere line to two zones about 4 feet apart. In some places the quartz reaches a width of 8 inches, in other places no quartz appears at all. Samples taken from various places showed low values, ranging from \$2.80 to \$4.00. I formed the opinion that the prospecting had been at fault as in the case of No. 1 vein.

The other veins are small and of no commercial importance at present; in many cases they have not been stripped for any length and their course and character remain to be developed.

OPINION

Examination of the property produces regret that more work has not been done on the exposures; the character of veins 1, 2, 3 and 9 demands that they should be exploited in depth, as well as intelligently followed upon the line of their outcrop. This has not been done.

No. 3 vein is of sufficient size and value to justify the expenditure required to ascertain its continuance in depth. The property can best be exploited by sinking the shaft on No. 1 vein as mentioned on page 3 and crosscutting from such shaft at a depth of 100 feet to both No. 2 vein and No. 3. The information to be obtained from these three veins at a depth of 100 feet would be a guide to the character of all other veins on the property, and would give some indication of the value to be placed upon this new district. The necessary development of the property can be done to a depth of 50 feet without power, but to sink deeper than 50 feet will require a small plant for both pumping and hoisting.

My estimate of the probable cost to do all of this work so as to open Veins Nos. 1, 2 and 3 is about \$15,000 and I believe that the results obtained from this expenditure would be satisfactory for the reason that all the geological conditions appear to be very favorable for the development of payable ore.

In the event of proving No. 1 and No. 3 veins to contain payable ore in depth, it may be taken as certain that the development of No. 4 vein would be profitable.

As the property contains more than half-a-dozen other veins besides those enumerated, the proving of values in depth will add very greatly to the potential value of these other veins.

JOHN E. HARDMAN.

REPORT ON MANIKUAGAN FELDSPAR DEPOSIT

BY

J. B. TYRELL, M. E.

INTRODUCTION by Mr. S. E. MELKMAN.

Numerous reports have been compiled by a number of prominent engineers who, from time to time, have examined this most phenomenal mass of feldspar, known as Quaticloo-Manikuagan Bay Deposit, in the Seigneurie of Mingan, County of Saguenay, Province of Quebec. The property was thoroughly described as far back as 1863, in a report by Messrs. Sir William E. Logan, Dr. T. Sterry Hunt, Alexander Murray and E. Billings, all Fellows of the Geological Society, and forming the Geological Commission of Canada. It has ever since been recognized as the greatest undeveloped deposit of feldspar in the world, but, due to its location, Canadian Capitalists were under the impression that the operating costs would be too high, and the property remained idle. In 1918, the British Magnesite Corporation developed the property into a mine, and spent some \$30,000,—in proving its value as a producer. All that remains now to be done, is to construct a wharf at the mine, and to operate a steamer between the property and some such point as Halifax, Montreal, or Quebec; to maintain a warehouse at either of these cities, and to ship the material from there all over the world.

REPORT ON FELDSPAR PROPERTY ON THE SHORE OF QUATICLOO-MANICOUAGAN BAY, QUEBEC.

By J. B. TYRELL, Mining Engineer.

TORONTO, CANADA.

Quaticloo-Manicouagan Bay is situated on the North Shore of the Gulf of St. Lawrence in Latitude 50° 18' North and Longitude 62° 45' West, 37 miles N. of Esquimaux Point and about 40 miles North of the middle of the North Shore of Anticosti Island.

The shore of this part of the coast is moderately low, and, while there are sand beaches here and there, as for instance at Esquimaux Point, its general character is rock, with numerous little rocky islands lying off it. The rock rises rather steeply out of the water into rounded hills which continue to rise to elevations of one hundred feet or more. In the more exposed places the hills are devoid of timber and are either quite bare or are covered with small shrubby plants, typical of the moorlands of Northern Canada. The hills in the distance appear to be somewhat higher and to be covered with a moderately dense forest of spruce.

The mining location under consideration, which contains the deposit of Feldspar, is situated on a peninsula about two miles long, which stretches south-westward into the Gulf and encloses behind it a bay that would seem to be a safe

harbour in all winds, except possibly those from the southwest. The bay has not yet been carefully sounded or fully charted, and a few rocks could be seen in it at low water, but I am inclined to believe that water of sufficient depth can be found in it to accommodate ocean-going vessels of all ordinary draughts. At the present time two good steamers, namely the "Natashquan" of 642 tons burden, and the "General Wolfe", of about the same size, run regularly during the open season from Quebec to Esquimaux Point, and doubtless either or both of these ships would be willing to continue their trips to Quaticheo if the business would warrant this extension of the journey. When I visited on the property on May 31st, 1910, I travelled from Quebec in the S. S. Natashquan and she took us into the mouth of the harbour, where she anchored in ten fathoms of water, and doubtless she could have approached much closer to the shore but that the weather was too stormy to explore a new harbour.

Anyone visiting that country may always be in close communication with the outside world, for the Canadian Government telegraph line from Quebec to the Straits of Belle Isle keeps close to the shore, and there is now a telegraph station just across the Bay, a couple of miles from the point.

Esquimaux Point, thirty-seven miles to the west, is a thriving village of about one thousand inhabitants, in which there are several stores, a telegraph and signal station, and a good wharf at which vessels of any draught can tie up.

Most of this portion of the coast appears to be underlain by a dark coarse-grained horn-blende schist striking in a North-easterly direction and with a vertical dip, with which is associated a finer grained quartzlike rock. Into this Schist, and running parallel with the Schistosity, great dykes of Orthoclase Pegmatite have been intruded. The walls of the dykes are in most places fairly well defined, but in other places huge masses of the Schist have been broken off and included in the Pegmatite, so that sometimes it is impossible to say whether a mass of Schist is actually connected with the wall rock or not. The lines of contact with these broken masses of schist are often very irregular and sometimes they dip at a low angle, giving the dyke an appearance of occupying an almost horizontal, rather than a vertical attitude. In other places narrow stringers of granite branch off from the dykes into the schist at all angles from the vertical to the horizontal.

The dykes vary in width from 11 to 200 feet, and extend from the extreme point of the little peninsula North-eastward for a mile or more on the property. Two of these parallel dykes were followed and examined, while south-east of these, on the adjoining islands, were other parallel and similar ones which appeared to be about equal to the others in size.

The pegmatite of the dyke is composed chiefly of Orthoclase (or Microcline) Feldspar and Quartz, with a small quantity of Biotite, a very little Muscovite and a few crystals of Black Tourmaline.

The Feldspar is generally pink or light grey in colour. In places it is separated out into large and very pure crystals twelve inches or more in diameter, but for the most part, even when the definite crystalline form is retained, it is mixed with small rods or bands of Quartz, the two together forming a typical Graphitic Granite. In such cases, the feldspar probably constitutes 80% or more of the whole. Very large quantities of this Graphitic Granite could be obtained free from any other minerals, as much of the rock of which the dykes are composed is of this character.

A small quantity of feldspar is also included in the more quartzose parts of the dykes.

Quartz is the other chief constituent of the Pegmatite. As in some places the rock consists almost entirely of Feldspar, so in other places it consists almost entirely of Quartz, with possibly a few large crystals of feldspar scattered here and there through it. Most of the quartz is white or light-grey in colour, but in some places it is of a beautiful pink colour with an opalescent appearance so that it would make ornamental stone. As a general rule these more highly quartzose portions of the Pegmatite are most common near the sides of the dykes, while the feldspar predominates near the middle.

Besides these larger masses Quartz constantly occurs as a constituent of the Graphie Granite as stated above, apparently forming 15 or 20% of its mass.

BLACK MICA (biotite) is present in variable quantity in different parts of the dykes, being, as a rule, most abundant near the walls where they come in contact with the Schist. It commonly occurs in plates and scales, sometimes six or eight inches long, and on the broken surface of the rock these appear as heavy black lines. As a rule it could readily be separated out from the Feldspar and Quartz by rough cobbing.

WHITE MICA is present in such small quantities as to be practically negligible.

TOURMALINE. A few crystalline masses of Black Tourmaline were seen but no difficulty would be experienced in separating it from Feldspar.

CONCLUSIONS

As would naturally be expected from their enormous size, these pegmatite dykes are very coarsely crystalline, and large and very pure crystals of feldspar are often segregated together in them into masses of considerable size which might contain hundreds or even thousands of tons. From these segregations a pure high grade potash feldspar could be obtained.

But the great portion of the feldspar in the dyke is closely associated with a small amount of quartz and forms with it a typical "Graphie Granite" usually very free from biotite or other deleterious minerals. Several millions of tons of feldspar in this form which is the "Standard Feldspar" of commerce, could be mined or quarried from this little peninsula, above the level of the tide water, and afterwards, as desired, doubtless very much more could be secured below tide water level.

As the feldspar occurs right on the edge of tide water, where the rock could be loaded into ocean-going vessels at trifling cost, it should be possible to mine and deliver it anywhere on the Atlantic Coast or in England at a very cheap rate per ton.

(signed)

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